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Annual Meeting of the Association for Tropical Biology and Conservation

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Tropical Ecology and Society
Reconciliating Conservation and Sustainable Use of Biodiversity

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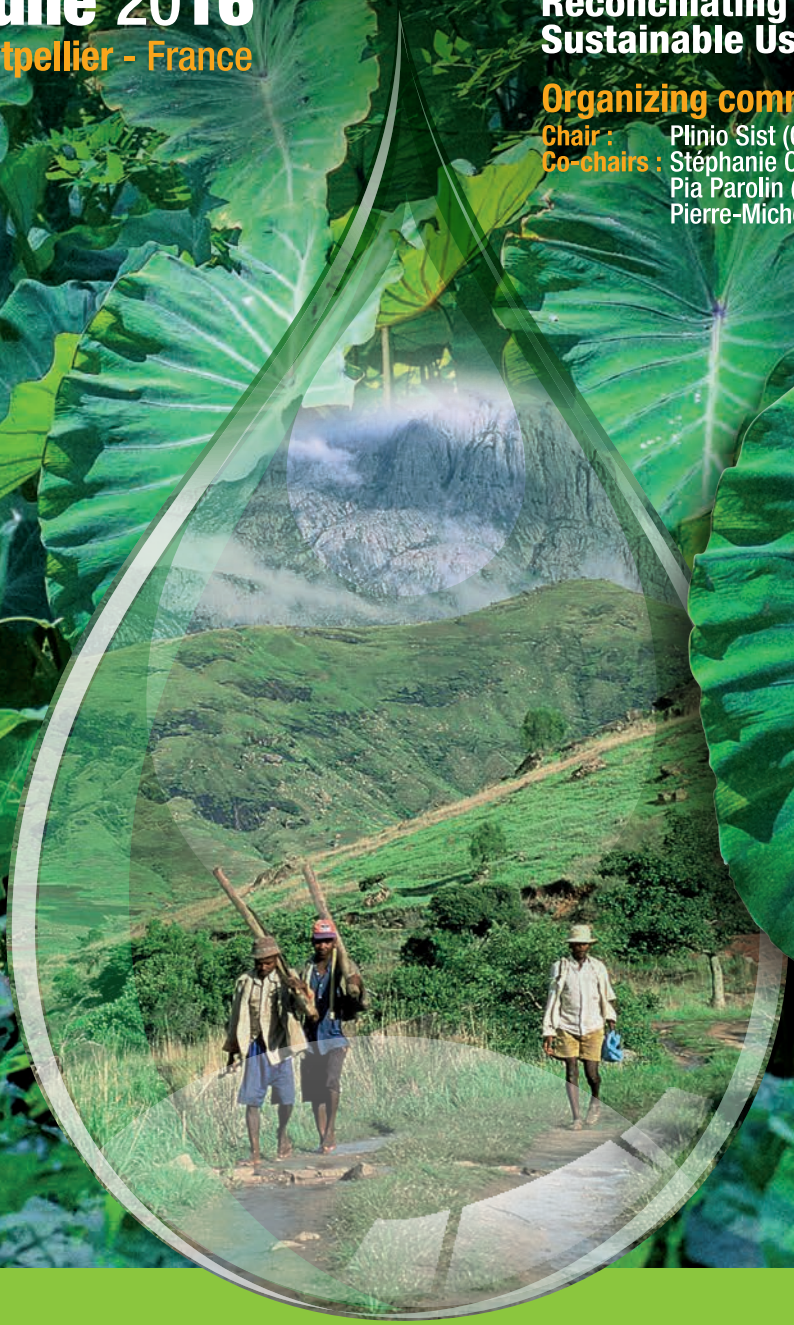

PROGRAM & ABSTRACTS

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O4-07 – S4 *Termites, earthworms and tropical soils: their diversity and conservation*
Monday 20 June 20 / 11:00-15:30 – Sully1

Should we fear termites?

DOMINIQUE LOUPPE
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This presentation is the introduction to the session, which will discuss the relationship between termites, soils and tree diversity in tropical forests.
Termites are insects known to attack dead wood, especially in buildings, and also crops and newly planted trees, giving termites a bad reputation and making them feared by all.
However, without termites the understorey of tropical forests would be covered with heaps of dead wood. So termites are definitely useful. In addition, termites also provide other services to humans, for food, poultry, agriculture, etc., and to the environment itself.
Termites have a major impact on soil quality, particularly on soil richness by increasing the pH, and the carbon and moisture content. Large termite mounds are much sought after by farmers in the Kisangani region (DRC) as they provide evidence of high soil fertility. In addition, termite burrows increase the infiltration of runoff waters and the galleries improve soil aeration; termites cultivate fungi on organic matter, increasing soil carbon content, etc. Some termite mounds may be indicators of soil quality: for example, typical termite mounds are found in temporarily flooded areas. All this explains why many tree species are associated with termite mounds where they exhibit better growth.
Termite diversity is very high, with about 4000 species (only 2600 known) and their distribution throughout the world shows how important it is to focus on termite impacts on the environment and forest diversity.

O4-08 – S4 *Termites, earthworms and tropical soils: their diversity and conservation*
Monday 20 June 20 / 11:00-15:30 – Sully1

What do humus-feeding soldierless termites really feed on?

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Background - Basal termites feed on wood, which they digest with the help of symbiotic protists. The most diverse and abundant termite family in the tropics, the Termitidae, have lost the protists. They rely either on a domesticated fungus (Macrotermitinae) or on a broad diversity of bacterial digestive symbionts (other subfamilies). Species of this latter group feed on a variety of substrates: some eat sound wood, while others (e.g., the Cubitermes-group) exploit clay-bound peptidic residues linked to humic acids. Between these extremes, there is however a broad range of alimentary niches occupied by many species variously qualified as [soil-wood] interface, intermediate, humus, or group III feeders (group II being wood feeders and group IV deep soil feeders), a variety of terms concealing our ignorance about their real source of alimentation. Here, I present some preliminary data on the diet of soldierless Apicotermitinae, a diverse and ecologically dominant group in African and American tropics, comprising many intermediate feeders.
Methods - We follow a multidisciplinary approach, including data on mandible morhology, digestive tract anatomy, gut content, stable isotope studies and analyses of foraging substrate.
Results - Soldierless termites present a remarkable diversity in their digestive anatomy, including crop size, gizzard and enteric valve armature, mixed segment and hind gut configuration. In French Guiana rainforests, soldierless termites forage on various substrates, including highly decayed wood, nest material from other termites, or soil, associated or not with trees or palms. Stable nitrogen isotope ratios differentiate species along the gradient of humification. They cover a very broad range of values and correlate with substrate properties. However, there is no simple relationship between gut anatomy and level of food source humification.
Discussion - Niche differentiation along the gradient of humification explains for a part the huge species richness of Neotropical soldierless termites. However, a finer analysis of actual food sources is needed to test for niche differentiation according to other criteria, and the diversity in gut anatomy remains to be explained. Besides analysing gut contents in more detail, we are now carrying parallel studies on African taxa and plotting results against a phylogenetic background to enlighten character evolution.